

MASSTOR SYSTEMS

M860 STORAGE MANAGEMENT SYSTEM

Equipment Description

Strategic Solutions

Masstor Systems' strategic product set provides integrated systems solutions for Moving, Storing and Sharing large amounts of data. New strategic products and solutions are required to manage the continued proliferation and dispersment of data processing power with the need to provide rapid access to large amounts of data.

- In the 1960's, the computer power was concentrated in the "machine rooms" and access to data was easy.
- In the 1970's, the computer power became more dispersed. The power outside the "machine room" equalled the power within the "machine room" and access to data became more complex.
- By the 1990's, the computer power outside the "machine room" will have grown to at least 10 times that within the "machine room." The "machine room" now has many mainframe computers, and access to data is becoming very complex.

Masstor Systems is committed to the enhancement of its product set to provide solutions for the environment of the 1990's. MASSNET for Moving, M860 Storage Management System (SMS) for Storing, and Shared VSS for Sharing access to large amounts of data.

MASSNET Moves Data

MASSNET is a family of hardware and software networking products that moves data at high speeds, up to 1000 times faster than telecommunication-based networks. MASSNET is used to move data among local or remote mainframes of similar and dissimilar manufacture.

M860 SMS Stores Data

M860 Storage Management System is a very high capacity on-line storage device that attaches to IBM or IBM Plug Compatible Manufacturer's mainframes. The M860 SMS improves the economies of storing large amounts of data on-line, and it stores up to 18 times more data than conventional disk in an equivalent amount of floor space.

SHARED VSS Shares Data

Shared Virtual Storage System is an integrated system solution for controlling and managing large amounts of data being shared in a dispersed computing environment. Shared VSS incorporates MASSNET and the M860 SMS and extends the benefits of the M860 to multiple mainframes of similar and dissimilar manufacture.

Summary

Our product solutions target the emerging needs of the world's largest data processing organizations. A large number of major corporations and institutions have installed Masstor Systems' products in broadcasting, banking, insurance, aerospace manufacturing, telephone, railroad, airline, oil, government, university and research environments.

Users of the Masstor Systems' strategic product set have realized the benefits of increased levels of productivity and service by implementing new applications such as automatic Disaster Backup and Recovery with economic benefit to the user. These applications dramatically increase the ability to share resources and improve the access to data.

MASSTOR SYSTEMS

Strategic Solutions to the Problems
of Information Management

Equipment Description

Masstor Systems Corporation's M860 SMS is a new generation, high-speed mass storage system. The M860 SMS sets new standards in price performance, reliability, space economy, and energy efficiency for on-line mass data storage devices.

Product Highlights

- High capacity data recording (175 million bytes/cartridge)
- High performance data recording devices
- High performance accessor
- Space saving, large capacity storage modules (55 billion bytes each)
- High level of system reliability
- High performance (transfers data to the host processor at channel speed)
- Read/write direct processing option

Easy Conversion

Two major problems associated with previous generation mass storage products were the high entry level price and the high conversion cost. Both these factors have been addressed by Masstor's M860 SMS. Now, even smaller data processing installations can benefit greatly from the M860 SMS. And, because this system is viewed by the user as a bank of tape drives, conversion effort and cost are reduced.

More Capacity—Less Space

Historically, the compounded annual growth rate of on-line data has exceeded 45 percent. However, new data storage devices' capacity improvements have not kept pace. As a result, many companies

have been, or soon will be, constrained by a shortage of computer room floor space.

The Masstor M860 SMS offers a long-term solution to this growing problem. Each 55 billion byte increment of storage capacity has a physical footprint of only 12.5 square feet.

A comparison of storage density illustrates the benefit of an M860 SMS. Excluding aisle space, a storage module of the M860 SMS holds 4,400 million bytes per square foot of floor space. That compares with 295 million bytes for an IBM 3380E, and 300-600 million bytes for a typical tape library. Measured by storage efficiency, the M860 SMS is 18 times better than the 3380E, and 9-17 times better than a tape library.

Energy Efficient

As energy costs continue to skyrocket, energy efficiency has become a major concern in data processing operations. Here again, the M860 SMS excels: operating power required per byte of storage is less than 10 percent that of an IBM 3380E.

All these features make Masstor Systems' M860 SMS the large capacity storage system of the future, offering:

- Reduced human intervention
- Reduced errors
- Improved system productivity
- Reduced computer room space requirements
- Reduced energy needs
- Low cost storage for new applications



Components and Operation

The main components of the M860 Storage Management System are the M860 Storage Management Task (SMT) software, the M861 Storage Module, and the M862 Storage Controller. All user information is stored in low-cost cartridges which, in turn, are stored in a unique, honeycomb-like system of cells inside the storage module. Each M861 has the capacity to store 55 billion bytes of user data. A maximum M860 system configuration can provide a total capacity of 440 billion bytes. Additionally, multiple M860 systems can be attached to a single CPU, or shared among several CPUs, providing an on-line capacity measured in trillions of bytes.

Through its compact, self-contained architecture, the M860 SMS not only reduces the need for large numbers of

tape and disk storage devices, but it also virtually eliminates the problems associated with the manual handling of tape reels and disk packs.

M860 SMS Operation

The central processing unit views the M860 SMS as if it were a tape subsystem. Data can be processed sequentially from the M860, as with tape, or it can be staged to disk, using standard tape-to-disk utilities, or via an existing disk management system. Therefore, conversion to an M860 SMS is easily and economically accomplished.

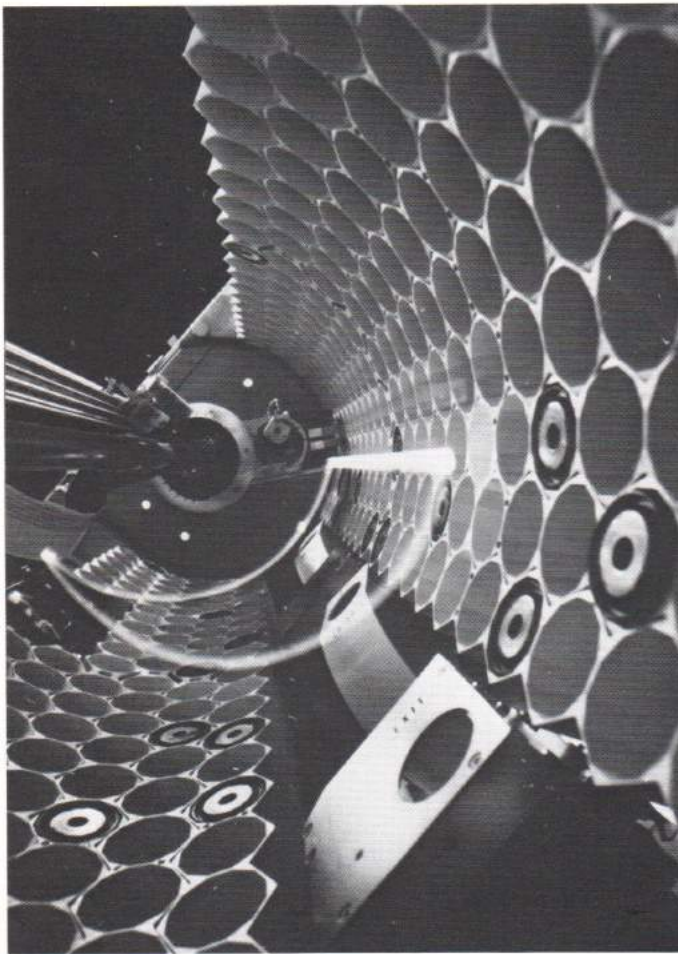
When a file resident on the M860 SMS is requested by the user, the M860 SMT is invoked as a part of the allocation process. A command is given by the M860 SMT to the M862 Storage Controller which activates the accessor

housed in the appropriate M861 Storage Module. The accessor removes the requested cartridge from its cell and transports it to a Data Recording Device (DRD). The DRD reads the data on the tape and the information is transferred through the M862 Storage Controller to the channel of the central processing unit. The entire process takes only a few seconds and requires no human intervention. When the processing of a file has been completed, new or modified data is written back to the same or a different cartridge for storage.

Features

- All data is under system control
- High throughput
- 55 billion to 440 billion bytes of data storage capacity per M860 system.

- Multiple M860 Storage Management Systems per CPU
- 175 million byte capacity per 3.5" data cartridge
- Data is stored as tape file images
- Multiple volumes on a single data cartridge
- High speed search to the requested volume or file
- Each M861 Storage Module contains its own Data Recording Devices, cartridge access station, and accessor
- Each M862 Storage Controller contains two Data Recording Controls and four channel accesses
- Simultaneous data transfer through each M862 Storage Controller with dual data path gives the effect of two controllers within one M862



Reliability and Serviceability

The M860 Storage Management System has been developed for maximum reliability and servicing ease.

The M862 Storage Controller has a standard floppy disk drive that allows for expanded diagnostic code and simple modifications to functional and diagnostic microcode.

The self-contained design of the M861 Storage Module eliminates the requirement for interframe alignment as storage is added.

The cylindrical shape of the M861 storage cell array allows the use of an accessor mechanism of remarkable simplicity with consequent high reliability. Fitted with a dedicated microprocessor, the accessor incorporates self-alignment and sophisticated diagnostic features.

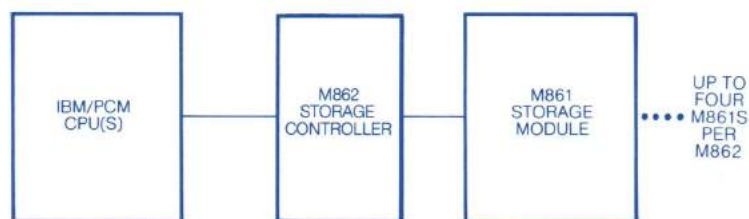
Each M861 Storage Module has its own manual cartridge access station. In the event of an accessor malfunction, entry to the array for manual cartridge picking is easily achieved.

The DRD, again controlled by a dedicated microprocessor, achieves enhanced reliability through a robust mechanical design employing very long life components; a high level of circuit integra-

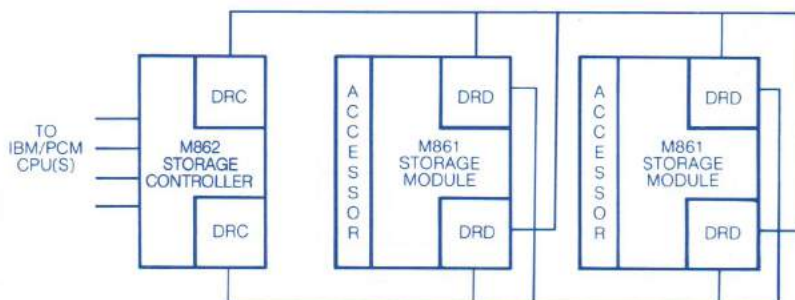
tion; programmed control sequences enabling automatic recovery from virtually any transient malfunction; and automatic adaptation to characteristics of each cartridge tape. Examples of the latter include adaptive signal amplifiers and a dynamic skew-compensating servo.

Use of redundant paths and devices ensures continued access to stored data even in the rare event of part failure.

Sample Configurations



M860 SMS ENTRY LEVEL
55 BILLION BYTE CAPACITY



M860 ENTRY LEVEL EXPANDED
110 BILLION BYTE CAPACITY